

JANUARY, 1959



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G. W. BATY, VK3AOM.  
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**VK5WI:** Sundays, 1000 hours SAST, on 7146 Kc. Frequency checks are given by VK5MD and VK5WI by arrangement on all bands to 58 Mc.

**VK6WI:** Sundays, 0930 hours WAST, on 7146 Kc. No frequency checks available.

**VK7WI:** Sundays at 1000 hours EST, on 7146 Kc. and 3572 Kc. No frequency checks are available.

**VK9WI:** Sundays, 0630 hours EST, simultaneously on 3650, 7146 and 14342 Kc. Individual frequency checks of Amateur Stations given when VK9WI is on the air.

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## EDITORIAL



## OUR I.T.U. REPRESENTATIVE TO GENEVA

As readers are now aware, John Moyle, VK2JU, has been selected as the representative from the Wireless Institute of Australia to accompany the Australian Government Delegation to the Administrative Radio Conference to be held in Geneva commencing on 16th August, 1959.

John Moyle needs no introduction to Australian Amateurs as he is well known to all as Editor of the Australian publication, "Radio, Television and Hobbies." In addition to his vast experience in the technical field of commercial radio he has a solid background of experience in Amateur Radio operating and W.I.A. administration extending back to 1932 when he was first licensed under the call sign of VK3JC.

He was born in Melbourne in 1908 and educated at Scotch College where he first interested himself in the technical side of Radio as editor of the school magazine. Although he spent some years as a journalist after leaving school, his natural interest in technical things directed his steps back into the world of radio and a year after obtaining his A.O.C.P. he moved to Sydney and operated under his present call sign, VK2JU.

During the years since 1932, he has given much to Amateur Radio, particularly in the v.h.f. bands where he conducted, with mobile equipment, explorations of all the now standard areas from Bowral to the Blue Mountains and Mt. Elliott in

the north of New South Wales, during which time he made the then longest contact over a seventy mile route using modulated oscillators and super-regenerative receivers in the 56 Mc. and 112 Mc. bands.

After serving with the R.A.A.F. during the war as Squadron Leader in charge of Technical Administration in the Directorate of Telecommunication and Radar, he again continued interest in Amateur Radio operating individual transmitters on all bands from 3.5 Mc. to 576 Mc. For two years he maintained schedules over 150 and 200 mile paths on 144 Mc. from a difficult city location where interference was at an all time high.

Concurrently he interested himself in and devoted much of his time to the administrative affairs of the N.S.W. Division of the W.I.A. where he served on various committees, as Federal Councillor attending five or more Federal Conventions, as Vice-President of the Division, and finally two years as President.

The problem of selecting a suitable representative to send to Geneva was not an easy one, but the Federal Executive is satisfied that in John Moyle it has chosen the best man in Australia to face the problems ahead. His vast knowledge and experience in both radio and administration will ensure that the Amateurs' case is adequately presented at Geneva.

FEDERAL EXECUTIVE

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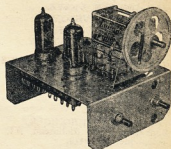
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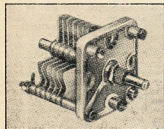
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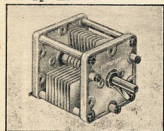
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817	Single Section	11	270	1,100	0.024
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		Min.	Max.		
831	Split-Stator	9	28	2,500 per sect.	0.080
832	Split-Stator	9	51	2,500 per sect.	0.080
833	Split-Stator	18	97.4	2,500 per sect.	0.080
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# Putting Sense into Transmitter Hunting

BY J. C. DUNCAN,\* VK3VZ

IN the "old days" of transmitter hunting it was the custom to take a bearing from the starting point, travel a few miles at right angles and take another bearing, then by triangulation, the direction of the transmitter could be determined.

If you have ever been out on one of the W.I.A. hunts you would realise that you would be a bad last if you adopted that old fashioned technique, because all the cars now make straight for the transmitter site and "home in" like pigeons, that is if pigeons flew in a straight line.

The answer is, of course, the use of Sense—and so a little theory on how it works.

Firstly, let's take the Loop Aerial. This is a large diameter coil, mounted on edge and capable of being rotated in a horizontal plane—let's see how it picks up the radio signals.

The sine wave represents the voltage of the received wave at any moment, and "A", "B" and "D" show the loop or frame at any instant in respect to the wave.

Firstly the frame can be considered as two vertical aerials joined at the top and bottom.

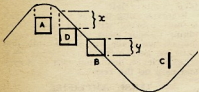


Fig. 1.

When the frame is at "A", the two voltages in the vertical sides are at maximum, but are acting in opposite directions around the loop, so their net effect is zero.

When the frame is at "D", the induced voltages are less, but differ in amplitude by an amount proportional to the length "x", and this is the effective voltage around the frame.

Due to the fact that the voltage in the frame aerial is the algebraic difference of the voltages in the vertical limbs, and in fact is proportional to the instantaneous rate of change of the magnetic and electrical force in the wave, it is often known as the differential e.m.f.

When the frame is at "B" and the flux at the centre of the frame is zero, we see that although the voltages in the side limbs are almost at a minimum, they are acting in the same direction around the frame (one side being in the positive field and the other in the negative field), therefore the frame voltage, which is proportional to "y", is at a maximum.

Note also that if the frame is now turned side on to the incoming wave, as at "C", the voltages in each leg will be equal and opposite at all points of the wave, thereby giving zero output.

This, therefore, corresponds to the null point of the loop.

The important point of all this is that as the output of the frame aerial is the algebraic difference of the voltages in the vertical limbs the output voltage of the loop will be 90° out of phase with the flux in the wave.

Several other facts can be deduced from the theory so far:—

- (a) The frame voltage decreases as the width of the frame is reduced, and
- (b) The voltage in the vertical limbs is proportional to their height, so therefore the signal pick-up is proportional to the area of the frame—so it pays to use the largest practical size.

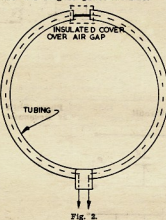


Fig. 2.

It is also obvious that if there are "N" turns in the loop, the output will be "N" times as great. So it is wise to keep the distributed capacity between turns as small as possible to allow the greatest number of turns to be used for a given loop diameter.

In most commercial installations, to avoid unbalances to ground, the loop is enclosed in an electrostatic shield, usually tubing which is open at the top, as in Fig. 2.

To obtain maximum pick-up from the loop we will need the most turns

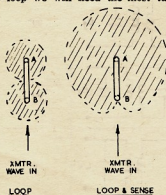


Fig. 3.

we can conveniently get, and therefore it will be necessary, as mentioned before, to keep the capacity to the shield and between turns to a minimum. A fairly large diameter tubing will help here, and in one commercial d.f. loop each turn of wire is woven through a flat insulated strip which is pushed into the tubing of the loop. Jumper wires then connect each turn to the next one.

When on a hunt, with the loop turned side on to the transmitter, we have the null or zero point quite clearly defined, but this only enables us to determine the line on which the incoming signal is being received, so if the bearing is north-south, which way do you go? It is here that we need Sense determination.

In Fig. 3 (a) we are looking down on the loop which is end on to the received signal and giving maximum output. The vertical limbs "A" and "B" are 180° out of phase with each other, as we have seen.

Now, say we introduce a voltage from a vertical aerial so that it is in phase with "A", we will then get a directional pattern as shown in Fig. 3 (b), with the voltage of the vertical aerial adding to the limb of the frame "A" and, if it is of equal voltage and opposite phase, cancelling the voltage at "B".

The technique is therefore to first pick up the transmitted signal with the loop only, and determine the line through the receiving point by the loop null. Then turn the loop end on, and listening to the signal carefully switch on the sense aerial and note if the signal rises or decreases. Revolve the loop through 180° and again switch on the sense. If the signal had shown an increase in level before, it will now show a drop as the vertical sense aerial cancels the appropriate side of the loop. A pointer on the rotating mast will now show the way.

## DESIGN OF A SENSE SYSTEM

Now, how can we design a sense system for our loop? Let's look at the important points of the loop first.

We know the loop voltage is 90° out of phase with the incoming wave regardless of whether the loop is tuned or not, but it is the currents which can be changed in phase by altering the reactance of the circuit.

If the loop is tuned the inductive and capacitive reactances cancel and the current will be in phase with the voltage, that is lagging the received wave by 90°. If, on the other hand, the loop is untuned, the circuit will be inductive and the current will lag the voltage by very nearly a further 90°, so we can see that the tuning of the loop is very critical.

The sense aerial voltage is in phase with the received voltage, but to keep the current in phase with the voltage, a resistance is usually inserted in series with the aerial to swamp any reactance which would upset this desirable state of affairs.

In Table 1 is shown a list of the usual circuits and the phase shifts involved, which will enable any Amateur to design his own sense system.

Now let's take an example. Fig. 4 shows a typical aircraft d.f. circuit. L1 and L3 resonate above the signal frequency (equivalent to No. 4 of Table 1). Therefore the phase shift is:

Radiation field to loop 90°  
L3 and L1 to L2 ..... 90°

= 180° or 0°

depending on which way the loop is turned.

C6, C2, L5 and L4 resonate at the signal frequency, as do L2 and C1 (equivalent to No. 3 in Table 1).

Therefore the phase shift is 0° and the sense aerial will be in phase with either one or other of the vertical limbs of the loop.

The resistor R is to vary the input from the sense antenna, and is adjusted to give complete cancellation of signal when the loop is in the position shown in Fig. 3 (b).

As the ear finds difficulty in judging signal levels over any period of time, it is desirable for the sense aerial to be connected for only a few seconds at a time. A simple arrangement is a low capacity toggle switch or push-

button in series with the sense aerial where it enters the receiver.

If it is possible to get a perfect null off the back of the loop at all times, the sense can be left on, but as you can see by the field pattern in Fig. 3 (b) the nose of the pattern is broad, and if any lobe exists off the back at all a small null will appear each side of the back lobe, and can give false readings. Also, with the car in different positions with respect to the incoming signal, pick-up of the loop and sense aerial can vary slightly, so com-

plete cancellation of the rear loop will not always apply.

If an "S" meter is used the sense can be left on, and an accurate reading obtained on the broad nose of the field pattern, but it is not satisfactory by ear. The only difficulty here is that with a keyed c.w. signal readings can only be taken during the key-down period.

Our technique has been to use the loop only for locating the line on which the transmitter is located and then to

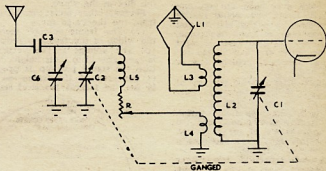


Fig. 4.

switch on the sense to determine in which direction to go.

The sense aerial is not used then until we get very close, and only if we are doubtful which side road to take, right or left.

Before leaving the car we again take a null bearing with the loop; then, taking up our loops and crystal diode meters, we walk along the null line until we get an indication. From then on experience, deduction, and good eyes and ears do the rest.

#### SENSE AMPLIFIER

The receiver in use in the car is a "Command", covering the range 3.2 to 7.5 Mc. inc. The antenna coil was modified by breaking the earth end of the inductance and connecting it to a co-ax connector on the front panel by means of a short piece of co-ax. A six-turn primary winding was also added to the lower end of the coil, and as this primary is subject to the full h.t. voltage, it was well insulated.

Fig. 5 shows the circuit of the sense amplifier and the modifications to the r.f. stage of the "Command" receiver.

A small chassis was made up and fitted in the space normally occupied by the genemotor, and on this the r.f. sense amplifier was mounted. This is entirely conventional with the aerial input coil pre-tuned to 80 metres. The plate of the r.f. amplifier was connected to the new primary winding by a length of co-ax to prevent interaction with the other wiring in the "Command" receiver.

The sense antenna was the normal b.c. receiver antenna, and was connected to a second co-ax connector on the front panel. A low capacity toggle switch was mounted close to this connector and the lead taken through the switch and thence via co-ax to the primary of the new sense amplifier aerial coil.

Gain of the sense amplifier is controlled by a potentiometer in the cath-

Type	Circuit	Phase Shift at Resonance
1. Series resonant circuit.		90°
2. Capacity coupled single resonant circuit, from a low impedance source.		90°
3. Two coupled resonant circuits (primary and secondary resonant at the same frequency) with reactive input coupling.		0°
4. Coupled resonant circuit having low frequency or high frequency primary with reactive input coupling.		90°
5. Two coupled resonant circuits from high plate resistance amplifier. (The primary and secondary resonant at the same frequency.)		90°
6. Coupled resonant circuit having low frequency or high frequency primary from a high plate resistance amplifier.		0°

Table 1.

ode circuit and is tuned to give cancellation on sense operation, when the loop and received signal bear the relationship shown in Fig. 3 (b).

To maintain electrical balance in the loop, the loop was tuned by a split-stator condenser with the stator earthed, and pick-up to the co-ax lead to the receiver was via a one-turn coil closely coupled to the tuned loop.

Now, how does our sensing check out?

# Sense Antenna Side:

- (a) Sense antenna to sense amp. grid (No. 4, Table 1) ..... 90°
  - (b) Sense amp. plate untuned primary to "Command" receiver aerial circuit (No. 6, Table 1) ..... 0°
- 90° total

# Loop Side:

- (a) Magnetic field to tuned loop ..... 90°
  - (b) Bottom few turns of grid coil inductance of r.f. stage directly coupled to loop through co-ax line (No.3, Table1) ..... 0°
- 90° total

# ALTERNATIVE SENSE SET-UP

The vertical effect in a loop aerial can cause poor nulls and is usually eliminated by grounding the electrical centre of the loop. If a resistance is placed in this ground lead the voltage due to vertical effect will be developed across it.

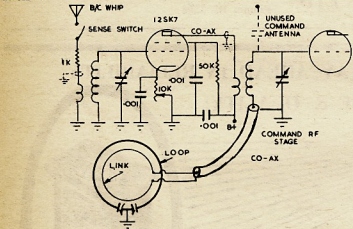


Fig. 5.

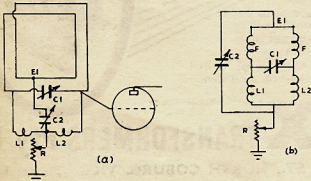


Fig. 6. (Fig. 6b is the same circuit as (a) but drawn in a different way.)

An interesting circuit which uses this effect as a sense antenna is shown in Fig. 6 (a) and (b). In this circuit a perfect cardoid can be obtained. The behaviour is easier to see if the circuit is re-drawn as at Fig. 6 (b). The vertical effect is used to give sense.

EF = two halves of frame.

Two degrees of freedom exist.

Frame effect is due to the a.m.f. induced round the frame, the complete frame circuit now consisting of the active section FF and also coils L1 L2 which are parallel with the frame across C1.

Acting as an open aerial the complete system is tuned by C2 and with this arrangement the phase of the vertical current can be made to balance the frame current, and the relative amplitudes varied as before with resistance R.

Obviously the data presented is only in very brief form, and it is suggested that those interested should study good reference text books on the subject.

Amongst those recommended are:

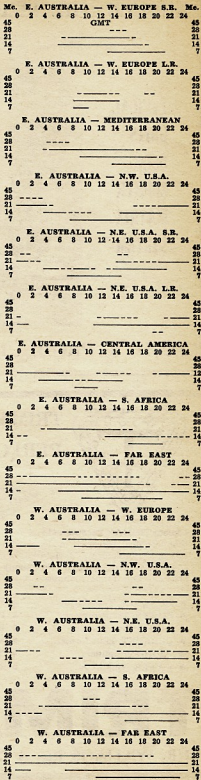
"Wireless Direction Finding," by Keen.

"Radio Direction Finders," by Bond.

# ERRATUM

An Automatic Morse Keyer, Dec. '58. On page 7, third column, between the seventh and eighth lines of paragraph under Fig. 2, insert: "response. In the rest state, the larger".

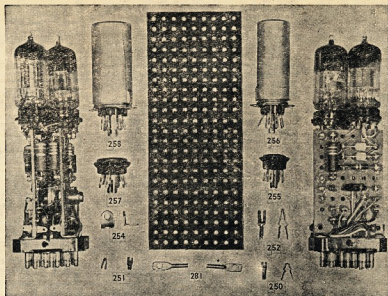
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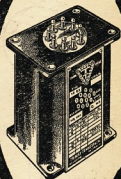
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# QUARTZ CRYSTAL FILTERS

## Including Part Six of Modifying the AR7 Receiver

### SECTION TWO

BY G. M. BOWEN,\* VK5XU

#### ALIGNING CRYSTAL FILTER

With the foregoing in mind, it should be possible to appreciate the steps set out in the succeeding paragraphs for aligning any crystal filter and i.f. channel. Before starting, make sure that the crystal is there. In the AR7 it is in a holder beneath a cover plate on the right hand side of the chassis. Remove the holder and check activity of the crystal by putting it (a) into a Pierce oscillator, (b) across the grid-ground circuit of the i.f. stage of a receiver, (c) into oscillator vacuum tube circuits shown in laboratory handbooks.

Having made certain that the crystal is there, switch it in and note whether any retuning of the broadcast station you are tuned to is required for maximum output. If it is so necessary, then proceed as under.

#### Alignment Procedure I.

(Assuming that the i.f. is correct—see "AR.") The method used will depend largely on what instruments are available and the first procedure is the simplest. A stable signal generator or frequency meter (BC221 or similar) is essential. No modulation of the signal is required since the receiver will have an "S" meter.

#### For the AR7

Switch in the crystal, set the selectivity control on 10 and the phasing control to centre scale.

Adjust the attenuator of the signal generator to a convenient level and swing the generator frequency slowly over 455 Kc., noting the peak on the "S" meter.

If one sharp peak only is observed, the i.f. alignment is correct; should, however, two peaks appear, this will show incorrect alignment or inaccurate setting of the generator. Its frequency should be set on the centre of the peak which appears the sharper—this should be 455 Kc., the crystal frequency.

Check the accuracy of the i.f. alignment by re-adjusting the iron slugs (leaving the grid circuit in T2 and T4 alone) for maximum peak on the "S" meter with minimum input from the generator.

If modulation is available, adjust T4 grid circuit for maximum peak audio output.

After carefully checking these circuits several times, only one sharp peak should appear on the "S" meter and the sensitivity of these circuits from the grid of the converter tube should be of the order of 10 microvolts.

With the crystal in, the signal to noise ratio should be improved and again further improved as the selectivity is increased after aligning T2 crys-

tal filter grid circuit. This is done as follows:

1. If no stable oscillator is available: Insert coil unit "B" and tune in a b.c. station. Switch in the crystal and set selectivity control on 0. Phasing control on centre. Adjust T2 for the best tonal qualities of the music (lack of high frequencies, and harshness is a guide) taking no account of the loudness of the music, etc. When the receiver dial is rotated slowly over the station the effect noticed should be the same as with the crystal out except for additional sharpness and loss of high frequencies.

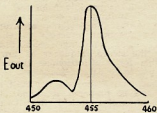


Fig. 11a.

On either side of the correct position when T2 is correctly aligned the tone will be low and drummy as the dial is rotated over the station and a distinct hollowness due to the crystal filter cutting the sideband, will appear on either side of the station.

Adjustment of T2 is made whilst rocking the dial until any asymmetry in the received signal disappears.

2. If a stable oscillator—unmodulated—is available: Place the generator exactly on 455 Kc. (crystal frequency) and connect output to the converter grid circuit in the usual way, or if using a BC221 a wire laid on the bench will give enough pick up.

Adjust T2 for maximum signal in the "S" meter.

Place oscillator on 450 Kc. and note "S" meter value.

Place oscillator on 460 Kc. and note "S" meter reading, which should equal that for 450 Kc.

Adjust T2 until symmetry is reached.

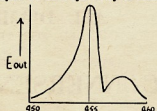


Fig. 11b.

B.f.o. Adjustment should be undertaken at the same time. Switch crystal in and with generator on 455 Kc. adjust the slug so that with the b.f.o. control on centre, zero beat is obtained. The slug can be reached through a hole in the b.f.o. shield under the chassis.

To check whether the phasing control is operating and the "notching" is occurring, place the signal generator on 453 Kc. approx., leaving the receiver as before and rotate the control anticlockwise then clockwise; there should be a distinct "plop" as the "notch" drops the signal out.

Alternatively, set the phasing control first on one side of centre and swing the oscillator from low to high side of 455 Kc. A sudden reduction in the signal will occur at frequencies above and below for the appropriate setting of the control (Figs. 11a, 11b).

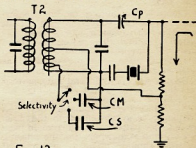


Fig. 12

#### For the SX28

The SX28 circuit corresponds to Fig. 12 and the filter as already indicated lies between the first and second i.f. tubes. Basically the bridge circuit remains the same, but the selectivity variation is achieved in three steps by detuning the secondary of the input transformer T2 with trimmer type ceramic capacitors, C<sub>m</sub> and C<sub>s</sub>.

Set up the signal generator or oscillator on crystal frequency as for the AR7 with selectivity in "broad" and "phasing" at zero. (The i.f. stages are already aligned.)

Vary the frequency of the signal generator over a small range ( $\pm 5$  Kc.) and adjust the top screw of T2 until the output (shown by "S" meter) goes through a maximum, dips down, and starts going up again.

Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maxima first noted.

Switch on the b.f.o., which would have previously been aligned to 455 Kc., and a "swishing" note, in contrast to the usual sharp crystal tone, will be apparent when the correct adjustment has been reached.

\* 73 Portrush Rd., Toorak Gardens, South Aus.  
\* Only proceed thuswise if it is pretty certain that some tampering may have taken place. Inspect the screws on the holder for a check.

Now, switch to selectivity "sharp" and adjust C30, the trimmer nearest the front panel, for maximum output whilst varying the signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of C30. Either one of these points may be used at which to leave C30. A sharply peaked tone will result at the correct adjustment.

For "medium xtal" adjust C29 until the output is mid-way between the broad and sharp positions.

Having got this far, it will probably be necessary to align more accurately the i.f. channel. So set the signal generator to the crystal frequency, the b.f.o. to approximately 1 Kc. tone, and the selectivity to "sharp i.f." and carefully re-align the i.f. transformers for maximum output.

Now, you will have noted, that the signal generator frequency has to be "wobbled" either side of the crystal frequency in order to obtain the correct symmetry of the filter circuits. Therefore the quickest and best way to align any i.f. channel and crystal filter is to use a frequency modulated oscillator and a c.r.o. For those who have access to these, proceed with the following:

#### Alignment Procedure II.

(Using wobulator and c.r.o.)

#### For AR7

Connect the output of the wobulator across the converter grid circuit via a series capacitor and a 100K resistor to ground. The c.r.o. leads from the "Y" amplifier should connect to the diode plate load of the 6G8G as near as possible to the diode plate.

Switch to crystal in and note pattern on the screen whilst adjusting the phasing control and the selectivity control. Since the wobulator deviation frequency is synchronised to the c.r.o. sweep, the pattern should remain stationary and somewhere for the phasing control should give a symmetrical selectivity pattern.

If the i.f. channel is not correctly aligned to the crystal frequency two curves will appear as in Fig. 12a.

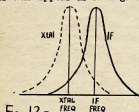


Fig 12a.

Leave the phasing control in this position. Align the i.f. transformers T1A, T2A, T2B (but do not touch L5A, the output of the filter) until the two patterns coincide. The i.f. patterns should move towards the crystal pattern.

When coincidence occurs adjust the selectivity control to maximum and the skirts of the curve should close in, still leaving the curve symmetrical. Return the selectivity control to broad position.

Now the aim is to adjust the output of the filter so that the phasing control when set at centre gives a symmetrical pattern with maximum amplitude. This

will mean adjusting L5 and the phasing control step by step until the rejection notch moves from one side to the other side of the peak as the phasing condenser is moved either side of centre.

The correct adjustment of L5A and phasing control should result in a "rejection notch" which does not alter its position horizontally as the selectivity control is adjusted. The curve should just "flatten out" at the peak and the notch. (Fig. 12b.)

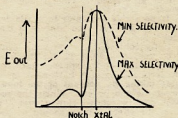


Fig 12b.

For best adjustments, use as small an output as possible from the wobulator resulting in a good pattern trace. Adjust the deviation accordingly as the alignment proceeds to enable good visual checking. And finally, keep the sweep frequency as low as possible for a distortionless trace, e.g. 16 c.p.s. to 50 c.p.s.

Remember, Rome was not built in a day, and be prepared to spend many hours of careful, patient effort, because in the end it really makes that AR7 or SX28 (and any other receiver) a communications receiver that can eliminate unwanted signals as close as 250 c.p.s. to the wanted one.

A bibliography will be attached hereunder giving all the books and articles to which reference has been made. Also the latter part of this article could not have been written without the tuition gained from Frank Wreford (ex-VK5DW, now residing in VK6). No text book that has been available since this article was contemplated has the complete answer to the problem and it is hoped that this article has now collated much technical data for those who can make use of it.

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#### APPENDIX

##### Single Signal Operation

A good crystal filter is of no advantage unless the operator knows how to use it and one of the best tricks is known as "Single Signal Reception." This applies particularly to c.w. reception but with limitations can be used for phone.

Pick a good solid c.w. signal, preferably a commercial station because it is likely to stay on long enough for the adjustment to be completed.

Turn on the b.f.o. and adjust control to the desired beat note. Place the selectivity control on the sharpest position and phasing control on zero.

Tune across the signal and note that there are two amplitudes appearing, one strong and one weak. Leave the tuning on the weaker of these two and turn the phasing control until this weaker signal is reduced to a minimum.

Finally tune to the stronger of the two amplitudes and adjust the b.f.o. control to a good operating tone.

Having made this adjustment for single signal reception of one signal no further adjustment is required as further signals are searched for. Of course the phasing control should not be altered.

##### Single Sideband Generator

The same principles which have been outlined in this article apply to the removal of the carrier and the unwanted sideband. Using crystal filters in series and shunt connections, the series resonance can be used to remove the carrier and pass the sideband, whilst the antiresonance frequency, due to the capacitance of the holder of the same two crystals, can block the carrier from being passed and the sideband from being shunted.

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AC4-Tibet	(23)	GM-Scotland	(14)
AC5-Bhutan	(22)	GW-Wales	(14)
AP2-Pakistan	(21, 22)	HA-Hungary	(15)
BV (C3)-Formosa	(24)	HB-Switzerland	(14)
C (unofficial)-China	(23, 24)	HC-Ecuador	(10)
C3-See BV.		HE-Galapagos Is.	(10)
C9-Manchuria	(24)	HE-Leichtenstein	(10)
C9-Chile	(12)	HH-Haiti	(8)
CE9, KC4, LU, VK0, VP8, ZL5-Antarctica	(13, 29, 30)	HI-Dominican Republic	(8)
CE0-Easter Island	(12)	HK-Colombia	(9)
CM, CO-Cuba	(8)	HK0-San Andres & Providencia	(9)
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CR4-Cape Verde Is.	(35)	HS-Thailand	(26)
CR5-Port. Guinea	(35)	HV-Vatican City	(15)
CR5-Principe, Sao Thome	(36)	HZ-Saudi Arabia	(21)
CR6-Angola	(36)	II, IT-Italy	(15)
CR7-Mozambique	(37)	II-Italian Somaliland	(37)
CR8-Goa (Port. India)	(22)	IS1-Sardinia	(15)
CR9-Macau	(24)	JA, KA-Japan	(25)
CR10-Port. Timor	(23)	JT1-Mongolia	(23)
CT1-Portugal	(14)	JY-Jordan	(20)
CT2-Azores	(14)	JZ0-Neth. New Guinea	(28)
CT3-Madeira Is.	(33)	K, W-United States of America	(3, 4, 5)
CX-Uruguay	(13)	KA-See JA.	
DX, DL, DM-Germany	(14, 15)	KA0, KG61-Bonin and Volcano Is.	(27)
DU-Phillipine Is.	(27)	KB6-Baker, Howland & Amer. Phoenix Is.	(31)
EA-Spain	(14)	KC-See CE9.	
EA6-Baleares Is.	(14)	KC4-Navassa Is.	(8)
EA8-Canary Is.	(33)	KC6-East Caroline Is.	(27)
EA9-Irni	(33)	KC6-West Caroline Is.	(27)
EA9-Rio de Oro	(33)	KG1-See OX.	
EA9-Spanish Morocco	(33)	KG4-Guantanamo Bay	(8)
EA9-Spanish Guinea	(35)	KG6-Mariana Is.	(27)
EL-Eire	(14)	KG61-See KA0.	
EL-Liberia	(35)	KH6-Hawallian Is.	(31)
EQ-Iran	(21)	KJ6-Johnson Is.	(31)
ET2-Eritrea	(37)	KL7-Alaska	(1)
ET3-Ethiopia	(37)	KM6-Midway Is.	(31)
F-France	(14)	KP4-Puerto Rico	(8)
FA-Algeria	(33)	KP6-Palmyra Group & Jarvis Is.	(31)
FB8-Amsterdam & St. Paul Is.	(39)	KR6-Ryukyu Is.	(25)
FB8-Cameroon Is.	(39)	KS4-Swain Is.	(7)
FB8-Kerguelen Is.	(39)	KS6-American Samoa	(32)
FB8-Madagascar	(39)	KV4-Virgin Is.	(8)
FB8-Tromelin Is.	(39)	KW6-Wake Is.	(31)
FC (unofficial)-Corsica	(15)	KX6-Marshall Is.	(31)
FE8-Togo	(36)	KZ5-Canal Zone	(7)
FE8-Fr. Cameroons	(35)	LA-Jan Mayen	(40)
FE8-Fr. West Africa	(35)	LA-Norway	(14)
FG7-Guadeloupe	(8)	LA-Svalbard	(40)
FK8-New Caledonia	(32)	LU-Argentina	(13)
FL8-Fr. Somaliland	(37)	LU-Z-See CE9, VP8.	
FM7-Martinique	(8)	LX-Luxembourg	(14)
FO8-Clipperton Is.	(7)	LZ-Bulgaria	(20)
FO8-Fr. Oceania	(32)	M1-San Marino	(15)
FP8-St. Pierre & Miquelon Is.	(5)	MP4-Bahrein Is.	(21)
FQ8-Fr. Equat. Africa	(36)	MP4-Qatar	(21)
FR7-Reunion Is.	(39)	MP4-Trucial Oman	(21)
FS7-Saint Martin Is.	(8)	OA-Peru	(10)
FUB, YJ-New Hebrides Is.	(32)	OD5-Lebanon	(20)
FW8-Wallis & Futuna Is.	(32)	OE-Austria	(15)
FY-Fr. Guiana & Inini	(32)	OF-Finland	(15)
GA-Egypt	(14)	OK-Czechoslovakia	(15)
GC-Channel Is.	(14)	ON4-Belgium	(14)
GD-Isle of Man	(14)	OQ5-O. Belgian Congo	(36)
		OX, KG1-Greeland	(40)
		OY-Faroes	(14)

OZ-Denmark	(14)	VQ8-Chagos Is.	(39)
PA0, PI1-Netherlands	(14)	VQ8-Mauritius	(39)
PJ2-Neth. West Indies	(9)	VQ9-Seychelles Is.	(39)
PJ2M-Sint Maarten Is.	(9)	VR1-Brit. Phoenix Is.	(31)
PK1, 2, 3-Java	(28)	VR1-Gilbert, Ellis & Ocean Is.	(31)
PK4-Sumatra	(28)	VR2-Fiji Is.	(32)
PK5-Borneo	(28)	VR3-Fanning & Christmas Is.	(31)
PK6-Celebes & Moluccas Is.	(28)	VR4-Solomon Is.	(28)
PK-Andorra	(14)	VR5-Tonga Is.	(31)
PY-Brazil	(11)	VR6-Pitcairn Is.	(32)
PZ1-Neth. Guiana	(9)	VS1-Singapore	(28)
SL, SM-Sweden	(14)	VS2-Malaya	(28)
SP-Poland	(15)	V54-Sarawak	(28)
ST2-Sudan	(34)	V55-Brunei	(28)
SU-Egypt	(34)	V56-Hong Kong	(24)
SV-Crete	(20)	V59-Aden & Socotra	(21)
SV-Greece	(20)	V59-Maldives Is.	(22)
SV-Dodecanese Is.	(20)	V59-Sultanate of Oman	(21)
TA-Turkey	(20)	VU2-India	(22)
TF-Iceland	(40)	VU4-Laccadive Is.	(22)
TG-Guatemala	(7)	VU5-Andaman & Nicobar Is.	(28)
TI-Costa Rica	(7)	W-See K.	
TI9-Cocos Is.	(7)	XE, XF-Mexico	(8)
UA1, 2, 3, 4, 6-European R.S.F.S.R.	(15, 16, 17)	XV-Viet Nam	(26)
UA1-Franz Josef Land	(40)	XW8-Lacos	(26)
UA9, 0-Asiatic R.S.F.S.R.	(17, 18, 19, 25)	XZ2-Burma	(26)
UA0-Wrangel Is.	(19)	YA-Afghanistan	(21)
UB8-Ukraine	(16)	YI-Iraq	(21)
UC2-White Russian S.S.R.	(16)	YJ-See FU8.	
UD6-Azerbaijan	(21)	YK-Syria	(20)
UF6-Georgia	(21)	YN-Nicaragua	(7)
UG6-Armenia	(21)	YO-Romania	(20)
UH6-Turkman	(17)	YS-Salvador	(7)
UI8-Uzbek	(17)	YU-Yugoslavia	(15)
UJ8-Tadzhik	(17)	YV-Venezuela	(9)
UL7-Kazakh	(17)	ZA-Albania	(15)
UM8-Kirghiz	(17)	ZB1-Malta	(15)
UN1-Karelo-Finnish	(16)	ZB2-Gibraltar	(14)
UO3-Moldavia	(16)	ZC3-Christmas Is.	(29)
UP2-Lithuania	(15)	ZC4-Cyprus	(20)
UQ2-Latvia	(15)	ZC5-Br. North Borneo	(28)
UR2-Estonia	(15)	ZC6-Palestine	(20)
VE, VO-Canada	(2, 3, 4, 5)	ZD1-Sierra Leone	(35)
VK-Australia	(29, 30)	ZD2-Nigeria	(35)
VK0-See CE9.		ZD3-Gambia	(35)
VK0-Heard Is.	(39)	ZD6-Nyassaland	(37)
VK0-Macquarie Is.	(30)	ZD7-St. Helena	(36)
VK9-Cocos Is.	(29)	ZD8-Ascension Is.	(36)
VK9-Nauru Is.	(28)	ZD9-Tristan da Cunha & Gough Is.	(38)
VK9-Norfolk Is.	(32)	ZE-Rhodesia South	(36)
VK9-Papua Terr.	(28)	ZK1-Cook Is.	(32)
VK9-Ter. of New Guin.	(28)	ZK2-Niue	(32)
VO-See VE.		ZL-Kermadec Is.	(32)
VP1-Brit. Honduras	(7)	ZL-New Zealand	(32)
VP2-Leeward Is.	(8)	ZL5-See CE9.	
VP2-Windward Is.	(8, 9)	ZM6-British Samoa	(32)
VP3-Brit. Guiana	(9)	ZM7-Tokelau (Union) Is.	(31)
VP4-Trinidad & Tobago		ZP-Paraguay	(11)
VP5-Cayman Is.	(9)	ZS1, 2, 4, 5, 6-Union of South Africa	(38)
VP5-Jamaica	(8)	ZS2-Prince Edward & Marion Is.	(38)
VP5-Turks & Caicos Is.	(8)	ZS3-St. West Africa	(38)
VP6-Barbados	(8)	ZS7-Swaziland	(38)
VP7-Bahamas Is.	(8)	ZS8-Basutoland	(38)
VP8-See CE9.		ZS9-Bechuanaland	(38)
VP8-Falkland Is.	(13)	ZA-Monaco	(14)
VP8-South Georgia Is.	(13)	3V8-Tunisia	(33)
VP8-South Orkney Is.	(13)	3W8-Cambodia	(26)
VP8-St. Sandwich Is.	(13)	4S7-Ceylon	(22)
VP8-St. Shetland Is.	(13)	4W1-Yemen	(21)
VP9-Bermuda Is.	(5)	4X4-Israel	(20)
VQ1-Zanzibar Is.	(37)	5A-Libya	(34)
VQ2-Nth. Rhodesia	(36)	9G-Ghana	(35)
VQ3-Tanganyika Ter.	(37)	9K-Wukait	(21)
VQ4-Kenya	(37)	9L-Aldabra Is.	(39)
VQ5-Uganda	(37)		
VQ6-Br. Somaliland	(37)		

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# Polarised Relays, Their Use in an Automatic Keyer

BY D. G. HAWTHORNE,\* VK3ZCD

**P**OLARISED relays are uncommon in Amateur apparatus, being comparatively expensive, and as they are not described in radio text books, surrounded by veil of mystery. This causes them to be dismissed as a specialised component, having no general use in Amateur equipment. It is hoped that this article will show that polarised relays are, in fact, simple devices of great versatility, having several advantages over the solenoid type relay.

Most readers have experienced the attractive force of a horse-shoe magnet on a nail or similar ferromagnetic material; however, if the nail was placed symmetrically between the poles, the net attractive force is very small, but, if it was moved nearer one pole, it was quickly drawn towards the magnet. It is also well known that unlike magnetic poles attract each other, whereas like poles repel, and that a current flowing in a coil produces a magnetic field passing axially through the coil, and having direction such that a clockwise current flow causes the "north-pole" to face the viewer. These three facts are the basis for the operation of polarised relays.

A simplified diagram of a polarised relay is given in Fig. 1. A permalloy armature, Am, is placed symmetrically between the poles of a horse-shoe magnet, being held in the central position by a spring suspension system, Sp. This spring resists any tendency for the armature to be drawn towards the magnet. Adjustable pole-pieces, P, enable the magnetic bias to be altered to suit the particular requirements. A fixed coil, C, is wound around the armature, which is free to move in an air gap in the centre of the coil. Movement of the armature can close the contacts Cm and Cs.

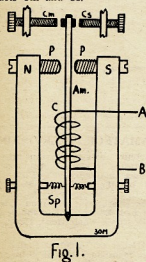


Fig. 1.

● In an article titled "An Automatic Morse Keyer," "A.R." Dec. 1958, the author stated reasons for use of a thermionic keying circuit instead of a simple relay circuit. "Ham" Radio Suppliers has recently obtained supplies of polarised relays. The low cost prompted the author to buy a couple to experiment with the possibility of their use in the keyer. These experiments have been entirely successful, as was to be expected, polarised relays being used for this purpose commercially.

The accompanying article contains a description of the modification to the original circuit, together with a description of the operation of polarised relays.

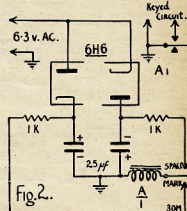
A current flowing through the coil will cause the armature to behave like a temporary magnet, the polarity depending on the direction of current flow. Consider a current flowing from A to B; the contact end of the armature behaves like the "north-pole" of a magnet. This will result in a net attractive force towards the "south-pole" of the horse-shoe magnet. If the current is large enough, this attractive force will overcome the restraint of the armature spring, and the contacts Cs will be closed.

On interruption of the current, the low retentivity of permalloy causes the residual magnetism in the armature to decay rapidly, the spring then returning the armature to the central position. It will be seen that a current flowing from B to A will cause the armature to move towards the contacts Cm. Thus polarised relays can distinguish positive and negative current flow.

Polarised relays are inherently more sensitive to small currents than the normal solenoid type. The attractive force on the armature of a polarised relay is directly proportional to the current magnitude, whereas the force on a solenoid relay armature is proportional to the square of the current magnitude. The standard 3000-type relay, well known in disposals equipment, requires 120 ampere-turns to operate a single set of change-over contacts; this is equivalent to a power requirement of approximately 60 milliwatts. A typical polarised relay requires only 2 ampere-turns to operate similar contacts; this is a power requirement of approximately 60 microwatts. The 299-type relay requires a current of 80 microamps, to operate, a power requirement of less than 5 microwatts. The sensitivity can be varied by adjusting the pole-pieces. By moving both equally towards the armature, the sensitivity is increased, the limit being when the attractive force resulting from a small displacement of the armature, over-

comes the restraining force of the spring. When adjusted for maximum sensitivity, the relay is very easily affected by mechanical shock and stray magnetic fields.

When the pole-pieces are closer than the position for maximum sensitivity, the spring has no control on the armature, which now behaves like the nail and magnet example mentioned earlier. However, if a current is passed through the coil in the right direction, the induced magnetism in the armature can cause the mutual repulsion of like poles to force the armature to the other pole-piece, where it remains after the current ceases, and until an opposite current can reverse the motion. The relay now behaves like a double-throw switch, with maximum sensitivity when the pole-pieces are at the critical position mentioned above.



By moving one pole-piece closer to the armature than the other, the armature can be made to rest against the contacts on the nearer side. A current of suitable polarity flowing through the coil can cause the armature to swing to the opposite contacts for the duration of the current-flow. This is analogous to the normal change-over relay operation.

The relays used by the writer are of American manufacture. They have two coils, one of 2,500 ohms used for the signal, and one of 200 ohms used for biasing for use in repeater circuits. The operating current minimum is between 200 and 100 microamps, depending on the care in adjustment, and the mechanical stability of the particular relay. 500 microamps sensitivity is easily obtained, and the relay is now not affected by stray influences. The relay is enclosed in a case of ferrous alloy to lessen influence of stray fields; the adjusting screws, reached by a lid in the top of the relay case, must be altered with the relay in the case, and with non-magnetic tools (the

(Continued on Page 14)

\* Flat 3, 11 Leopold St., South Yarra, Vic.



# Jointing of Aluminium & Aluminium Alloys

BY R. NEAL,\* VK3ZAN

• The author of this article kindly submitted sample welds to cover this article. One sample, consisting of two pieces of  $\frac{1}{2}$ " diam. x 18 gauge tube, was welded at right angles. We submitted this sample to test by applying a gradually increasing load. Failure occurred under a load of 210 lbs. There was virtually no plastic deformation of the tubing, indicating the strength of the weld to be far below that of the aluminium tubing. If we can take this particular sample as typical of results, it would appear advisable to take 100 lbs. as a safe working load. For beam construction it appears to meet a long felt want for ensuring good electrical joints. —Technical Editor.

or making electrical connections. By forming a fillet between two round sections to be joined at right angles an extremely strong joint will result, in fact as strong as the base metal.

Several joints of the above nature made by the author on 7/16" diam. 18 s.w.g. tubing when tested to destruction, broke a piece out of one of the tubes rather than break at the applied metal.

Ordinary 50-50 soft solder can be applied over the decaust metal in the normal manner, thus joints between copper and aluminium can be made satisfactorily by first applying the decaust to the aluminium and then using

normal soldering processes, however if two dissimilar metals such as these are joined care must be taken to prevent corrosion at the joint.

Corrosion tests in a humidity cabinet on aluminium joined with decaust metal showed only slight corrosion of the applied metal, but the aluminium was not effected. It is not considered necessary, therefore, that joints, even on antennae exposed to the weather, need be protected in service.

Decaust welding rods are available from suppliers of gas welding equipment in sizes of  $\frac{3}{16}$ " diameter by 12" long at a cost of approximately 7d. per stick.

Try it; if you are not completely satisfied with the results, the author will only be too pleased to answer any queries.

## MOUNTING BRACKET FOR MOBILE ANTENNA

With the growing interest in portable and mobile operation, and the adoption of ex-disposals equipment for this purpose, the following method of attaching a five inch diameter flexible (rubber) antenna mount to a car may be of interest to Amateurs.

The attached sketch will speak for itself. The measurements shown will fit the rear bumper bar mounting bolt of a Morris Oxford (1953 model).

First, the mount itself was obtained (from disposals sources) at a cost of 12/6.

A local engineering firm constructed the supporting bracket and fixed it on the car for the princely sum of 13/6. The material used comprised: One 6" length of  $\frac{1}{2}$ " mild steel,  $\frac{1}{4}$ " wide; one  $\frac{1}{4}$ " length of  $\frac{1}{2}$ " mild steel,  $\frac{1}{4}$ " wide; one 5" diameter plate,  $\frac{1}{4}$ " thick.

First the two pieces of steel were welded as indicated, then the plate welded on top. It had been found necessary to trim the plate and the base of the antenna mount to fit it in. This meant only five mounting holes remained out of the original six, but the job is quite satisfactory. (Used  $\frac{1}{4}$ " metal thread screws and nuts.)

I had a hole bored in the plate to facilitate leading a co-ax cable to the bottom of the mount and a grommet fitted to protect the cable.

The job is quite robust and inconspicuous if the antenna is not standing.

I suggest the steel work be painted to match the car prior to mounting.

One bolt holds the bracket to the car and it is supported by the bumper mounting bracket.

No doubt this idea could be modified to suit other vehicles with little difficulty and certainly it would not be a costly job for any vehicle.

—T. Laidler, VK5TL.

WE have all been confronted some time or other with the problem of jointing aluminium or aluminium alloys, be it in tube or sheet form. Most of us have also probably tried some of the alloys on the market that are supposedly excellent for soldering aluminium. In the experience of the author, none of these solders will give a satisfactory joint, however by applying a little more heat, such as from a blow lamp or gas flame, a very satisfactory joint can be made by using decaust welding rod without the use of a flux.

If you have not used this previously, you will be surprised by the ease at which this material runs onto a clean heated aluminium surface. You will also be surprised at the strength of the joint.

The method is to first of all clean the parts to be joined with a file or sand paper. Then the parts must be "tinne"—heat them over a clean flame until when the end of the decaust welding rod is applied to the part it melts and you will notice how freely the material from the rod adheres to the parts to be joined.

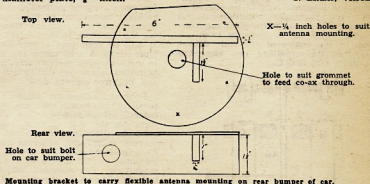
While the heating of the parts to be joined is in progress, keep testing the temperature by rubbing the end of the decaust rod on the part, but do not leave the rod in the flame any longer than necessary, otherwise it will become soft and brittle and will break off when next applied to the part.

After "tinne", hold the two parts to be joined together over the flame and keep testing the temperature with the rod until the decaust flows into the joint.

It will be wise to direct the flame away from the joint while the rod is being applied, otherwise trouble will be experienced with the rod becoming too hot.

Make sure that both parts to be joined are hot enough by melting the rod onto both parts.

This method can be used for inserting sections in a chassis—a neat fillet can be made with the decaust rod, or joining elements to booms of antennae



## AMENDMENTS TO 1958 R.D. CONTEST RESULTS

In the Listeners' Section, G. R. Morris (VK3) was shown with a total of 189 points. This was only his 80 mx score. His correct total is 1074 points. The amended Award Winners for VK3 now read:—

VK3—G. R. Morris	1074 points
A. C. Stebbing	815 "
C. T. Taylor	793 "

Erratum.—Under the heading of Call Area Awards, the sub-headings of "Open" and "C.W." should be transposed.

## AMATEUR TELEVISION

Amateur Television enthusiasts may be interested to know that an excellent little magazine called "CQ-TV" is published by the British Amateur Television Club. Membership to this club is 10/- (sterling) per annum, payable to the new Editor, J. E. Tanner, of 16 Norfolk Drive, Chelmsford, Essex, England.

In a letter to "Amateur Radio," John Tanner mentioned that he enjoyed following VK6EC/T's series of t.v. articles in "A.R."

\* 11 Xavier Street, North Essendon, Vic.

## MEET THE OTHER AMATEUR AND HIS STATION

### BOB ELMS\* VK6BE

BOB Elms was born in Western Australia in 1923. First interest in Radio was acquired during the war, when he served for several years in a signal unit. This was followed up after the war, but Radio as a hobby was restricted to broadcast set and audio until the A.O.C.P. was passed in January 1955.

Main interest is centred on the v.h.f. bands, particularly 50 Mc. Other bands worked at 80, 40, 20, 15, 10 and 2 metres. Gear for this latter band is being re-built. DX stands at about 75 countries at present. 50 Mc. DX is VK2, 4, 5, ZL, ZS2, JA1 to 6 (about 250 QSOs with 140 different JA stations).

Seen in the photo from top left to right are valve and circuit tester, clock, barometer, thermometer, tins of parts, five-band aerial tuner (above head). Below these are power supply for converters, text books, 144 and 50 meg. converters with switching device below, preselector (VK5AX type, but using 6AG5 and 6C4), c.r.o. and tape recorder (behind head).

29 Central Road, Kalamunda, West. Aust.



On the bench may be seen Eddystone "750" and rig consisting of Gelofo v.f.o., VT501 buffer, HK257B final running 120 watts.

In the extreme bottom left hand corner can be seen the corner of a cabinet containing EL34 class B modulator and tone oscillator. Above (out of photo) are 6 and 2 metre transmitters each running 120 watts to HK257B, and also filament and relay supplies.

All high voltage supplies are built into the wall cavities behind the door

of the shack, high voltage leads being run through conduit to the transmitters. A control panel distributes power to the transmitter in use.

The antenna system consists of yagis on 2 and 6 metres (four over four) atop a forty foot steel tower, and a dipole for the other bands.

Occupation is a school teacher (primary level).

Other hobbies are music (choir and organ chiefly) and cricket.

## I.T.U. FUND DONATIONS

Donations towards the fund to send an officially Government-recognised delegate to Geneva next year are still being received, but the tempo has slowed down during the last couple of months. It now lies largely with the Divisions by the way of publicity over official W.I.A. broadcasts to continue to enliven interest and subsequent subscriptions. Our nominated delegate has been made known and all members and others should give their valued support to the Fund in status and financial less favorably placed in attendance at this International Conference of utmost importance to every Amateur.

Your donations should be sent to:—  
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The following are the list of additional donations to the 7th December:—

- £25/0/0: South Australian Division, VK5WL.
- £25/0/0: N.S.W. Amateur Radio Co-op. Society.
- £2/7/6: C. C. Quin, VK2AWQ; K. H. Meallin, VK3NJ; G. C. Ramsay, VK5GD.
- £1/1/0: R. G. Graf, VK3CT; J. W. Jackson, VK4CN; G. N. Harley, VK4GH.
- £1/0/0: R. H. Yulle, VK2HU; W. P. Nelson, VK2KH; VK2 Anonymous, Caringbah; R. S. Mackay, VK3AYA; E. H. Jenkins, VK3QK; A. W. Adams, VK3JV; J. G. Haliday, VK4HZ; H. R. Hodgson, VK5AP; F. K. Tapscott, VK3CH; H. Robinson, VK5DN; J. P. Sullivan, VK3KJ; G. F. Lucas, VK5LL; A. F. Leal, VK6LQ; R. E. Montrieux, VK5EB; E. Bruden, VK5EG; G. Cranby, VK7GC; D. Jose, Nauru, VK9DJ; K. A. Hancock, Tas.
- Under £1: E. H. Zahmel, VK4MU (10/8); J. Jeffreys, N.S.W. (10/-); G. Wells, Tas. (10/-).

The progressive total receipts to 7th December are £1,868/18/6.

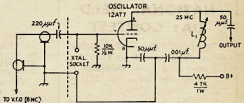
## USING BC459 WITH VHF OVERTONE OSCILLATOR

Although using the BC459 (7 to 9 Mc.) as the v.f.o. for a 50 Mc. transmitter may be old stuff to many v.h.f. men, it is possible that some newcomers to the World Above 50 Mc. may not realise how easy it is to couple one of these Command transmitters to the ever popular overtone crystal oscillator.

Fig. 1 shows the method of coupling a BC459 to the grid of a triode overtone oscillator. The oscillator portion of the circuit (components to the right of the dashed line) is identical to that used

One interesting feature of the arrangement is that the overtone circuit takes on an entirely new look merely by replacing the crystal with the v.f.o. connections. The instant that the crystal is removed and a ground connection provided at the crystal socket, the circuit becomes that of a frequency multiplier. In this case the stage becomes a frequency tripler using 8 Mc. excitation for 25 Mc. output. Incidentally, the stages that follow the 12AT7 oscillator are also of Handbook design.

Fig. 1.—Circuit diagram of a v.h.f. overtone oscillator driven by a Command transmitter. W8DRY uses a BC459 (7 to 9 Mc.) as the v.f.o. and drives a 50 Mc. frequency multiplier with 25 Mc. excitation obtained from the 12AT7. L1 is 24 turns No. 39 gauge enamel close-wound on a 3/8 inch slug-tuned former.



in simple transmitters described in the V.h.f. Transmitters chapter of recent editions of the Handbook. To the left of the dashed line, we see the co-axial line from the v.f.o., a 220 pF. coupling capacitor and the connections to the transmitter crystal socket. All connections to the transmitter end of the co-axial line should be as short as possible.

The required v.f.o. range for covering the entire 50 Mc. band is 8.333 to 9 Mc. Stable output throughout this range is obtained here at W8DRY by operating with only 105 volts applied to the oscillator and both the plates and screens of the amplifier tubes of a BC459.

—R. L. Eberwood, W8DRY, "QST" Dec. 57.

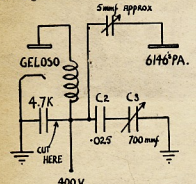
# HINTS AND KINKS

## NEUTRALISING THE STAGE AFTER THE GELOSO V.F.O.

This bridge circuit is suitable for the task. It has the advantage of easy adjustment to take care of

- C1 = Tube grid-plate capacit. (Cgp)
- C3 = Tube input capacitance (Cin)

Now to arrange this bridge it is necessary to remove the by-pass to earth capacitor from the tank coils in the Geloso unit as this is many times too big.



The neutralising is done by altering the value of C3 and this control is brought out to the front panel and the positions for each frequency can be marked on the panel. C3 is a receiver-type variable. C2 is to protect the h.t. in case the plates of C3 short.

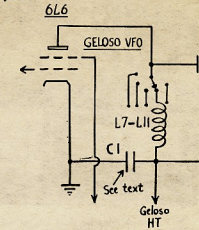
The high inductance of the slug-tuned Geloso coils avoids the danger of C3 forming an unwanted series-tuned resonance circuit.

—Arnold Holst, VK3OH.

## NEUTRALISATION OF SINGLE-ENDED FINALS

Many Hams have found it a difficult job to stabilise their p.a. stages using the new 6146 tubes. This article deals with a transmitter using a Geloso v.f.o. as the driver stage, but the procedure can be applied to any transmitter using a similar circuit design. Instability in

the p.a. shows up when tuning the final tank condenser. Under tuning conditions the final grid current should remain quite steady, any variation indicating that regeneration is taking place.



In order to neutralise the final stage it is necessary to take a small portion of the output power and feed it back to the p.a. grid 180° out of phase. When using the Geloso as a driver, the obvious place to apply this is at the bottom or B+ end of the output coils (L7 to L11). Now the feed back power depends on two things, firstly, of course, the size of the neutralising condenser C2, and secondly the size of the r.f. by-pass C1. The larger this condenser is, the greater the feedback power needed.

To work out the values needed for both the by-pass and neutralising condensers, we can use a formula taken from the A.R.R.L. Handbook which gives the following:

$$C2 = \frac{5000 \text{ Cgp}}{Cgf}$$

In this formula C2 is the capacity of the neutralising condenser, 5000 is the size of the by-pass condenser in the Geloso. Cgp is the grid-plate capacity of the p.a. tube or tubes, and Cgf is the grid-cathode capacity of the p.a. tube plus the output capacity of the 6L6 or 6V6 in the Geloso. Assuming the use of two 6146s in parallel and a 6L6 driver we have the following:

$$C2 = \frac{5000 \times 0.44}{(13.5 \times 2) + 12} = 55 \text{ pF. approx.}$$

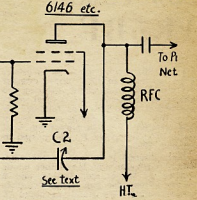
Now obviously this is far too high in value for a neutralising condenser, so we have to reduce the capacity of the Geloso by-pass condenser until C2 becomes a reasonable size.

The size arrived at was 500 pF., a ten times reduction, which also gives a ten times reduction in the neutralising condenser and brings it out at 5.5 pF. which is a more practical size. This can be met with a small three-plate condenser with double spacing. One of the double-spaced trimmers from an AT5 or a No. 11 is ideal if cut down to three plates.

Neutralising procedure is to adjust C2 for least variation in grid current against final plate tuning at the highest frequency used. By the way, the

reduction of the 5000 pF. condenser to 500 pF. has no effect on the output of the Geloso, however the coils will need to be re-peaked for maximum grid current on the final.

—Ron Fisher, VK3JM.



## POLARISED RELAYS, THEIR USE IN AN AUTOMATIC KEYER

(Continued from Page 11)

writer uses a piece of heavy gauge copper wire). It is suitable for use as a high-speed keying relay, one now being used in a keying circuit for translating the signals from a Wheatstone tape transmission into Morse.

The circuit of the keyer is given in Fig. 2. The 6H6 is used as two opposed half-wave rectifiers, charging the capacitors to about 4 volts, more than sufficient to operate the relay. The resistors are used to limit the current flow caused when both brushes make contact, this occurring if the tape breaks or when the end is reached. The relay is adjusted for the bistable operating condition, a current of 500 microamps. being required to effect change-over.

The rest of the keyer is as described in an earlier article, the polarised relay replacing the Eccles-Jordan trigger in the original circuit. The relay circuit has the advantages of simplicity and ease of operation, being unaffected by variation in line-voltage and components. It can follow Morse at speeds up to 40 words per minute.

Many other uses for polarised relays in Amateur equipment could be listed, but the readers will see that the slightly greater cost of the relays is offset by their advantages in applications where discrimination between polarities is required, or where only small currents are available.

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## NATIONAL FIELD DAY CONTEST

The draft rules of this Contest having been ratified by Divisions, the rules will be as published in the September issue (p. 16) of "A.R."

It is hoped that the amended rules will entice more participants in this event. There are sections for h.f. and v.h.f. this time.

Remember the date: **Sunday, 25th January, 1959.** Have your portable equipment ready to enter this Contest.



# RADIOTRON

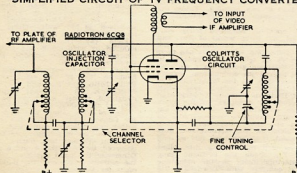
## TELEVISION VALVE SERIES

### Frequency Converters & IF Amplifiers for TV Receivers

The desirable requirements for TV frequency converters and if amplifiers can be summarised as follows:—

- transconductance should be high to provide as much gain as possible in the low-impedance, wide-band circuits used in a TV receiver.
- the equivalent noise resistance should be low for good signal to noise ratio in the frequency converter stage.
- there should be little feed-through from the oscillator to the rf stage to keep the oscillator radiation to a minimum.
- the oscillator section of the converter should have good frequency stability, and possess characteristics which make oscillation of the right amplitude easy to obtain.
- the application of a variable control voltage to the grid should not have any appreciable effect on the input impedance to the valve when used as an if amplifier.

#### SIMPLIFIED CIRCUIT OF TV FREQUENCY CONVERTER



Theory predicts that the higher the transconductance ( $g_m$ ) and the sharper the cutoff characteristic in the mixer section of a converter, the higher will be the conversion transconductance ( $g_c$ ). The lower the bias required for plate current cutoff, the smaller the oscillator injection voltage that is required for maximum  $g_c$  and hence the lower is the oscillator radiation. Multigrad types of converters, i.e. those in which the signal and oscillator voltages are applied to separate grids, can be shown to be noisier and to have lower  $g_c$  at high frequencies than the types in which both voltages are applied to the one grid.

For the oscillator the most satisfactory operation is obtained by using a triode of high  $g_m$  and medium amplification factor ( $\mu$ ) in a circuit which will provide good frequency stability. The Colpitts type is often used for this purpose.

The series connection of the oscillator and mixer sections of the converter across the B+ supply offers the advantages of a reduction in current drain and more constant oscillator injection over the frequency range, due to the current-stabilising effect of this type of connection.

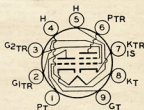
To maintain a desired relationship between transconductance and input impedance for valves used in the gain controlled stages of if amplifiers an unbypassed cathode resistor is commonly used; the use in if amplifiers of valves with internally-connected suppressors then presents difficulties in obtaining satisfactory stability. Valves featuring a tetrode construction avoid this complication.

The Radiotron 6CQ8, which has been especially designed to meet the requirements mentioned above, features a plate current characteristic with a sharp knee at relatively low plate voltages and mixer operation with good linearity in the frequency converter stage in the TV receiver. The tetrode construction of the 6CQ8 avoids the difficulties in stability outlined above, and together with the other characteristics of this valve, allows high performance to be obtained as a TV if amplifier. The tetrode section is also suitable for use as a sound if amplifier and agc amplifier. The triode is suitable for use as a sync. separator and af amplifier, and as an af output stage where only moderate output is required. The triode may also be used as a cathode follower driven by the tetrode section in the video amplifier stage.



## 6CQ8

SOCKET CONNECTION  
Bottom View



- PIN 1: TRIODE PLATE
- PIN 2: TETRODE GRID NO.1
- PIN 3: TETRODE GRID NO.2
- PIN 4: HEATER
- PIN 5: HEATER
- PIN 6: TETRODE PLATE
- PIN 7: TETRODE CATHODE, INTERNAL SHIELD
- PIN 8: TRIODE CATHODE
- PIN 9: TRIODE GRID



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# V.H.F.

Frank P. O'Dwyer, VK3OF  
190 Thomas Street,  
Hampton, Vic.

Lance VK4ZAZ has struck oil. Following his comments on the year's activity and views on the band, here is a letter from Bob 6BE: "Having been fortunate enough to have six contacts J.L.S.L. during the first half of the year, I have been in the position of being able to sit looking for DX at all hours of the day and night; I have done just that. First DX break through to VK4 came on March 1 with a JA opening. Others followed at very frequent intervals (daily and twice daily for up to ten days at a stretch). These openings lasted till May, with two or three being experienced in June. July and August brought nothing although the VOSK was heard several times on 49.6 during this period.

"On Sept. 6 the game was on again with JAs coming in at very good strength. Openings since this date have been very frequent, daily for days at a stretch. During this period VK4 had their first taste of T.E. when two or three openings occurred, the first on record in this State. All other contacts appear to have occurred on 49.6 during this period.

"Apart from JA working, VSD2Q has been contacted by several stations, VU217 was heard by one, DU has been heard working JA, and there have been a few contacts with JAs from May 4 (F2 also), and one E. opening into VK5 was worked early in Oct. There have been several identifications in the past. The band identification has been possible. (If only ALL the v.h.f. stations would tune the band any time they make a transmission.)

"Now regarding 4ZAZ's comments re VOSK. There are a number of points to be noted. (a) Me, and I'm afraid this one spoils his theory as it sometimes broadcasts a different programme. Hardly possible for a parasite. Theoretically there should be a regular signal intended for local consumption. No, we don't agree with 4ZAZ that it is a parasite. Other arguments are (b) the signal is not very stable. It has clung tenaciously to 49.6 since at least March 9 when it was first heard here. (c) It has been copied by at least 10 stations in the last 12 months. (d) Deviation appears to be 75 Kc. (e) It QSLs and I have its card in my possession.

"That raw carrier on 49.6 is not as raw as it seems either. It is a modulation in the form of a 30 or so cycle tone. Other similar carriers have been heard in VK5, some with a tone of about 1 Kc. and some with both 30 cycle and 1 Kc. tone. Some of these appear to beam from the Middle East, and others from the north. Suggestions for overseas stations to beam to telemetric stations along on oil pipe lines.

"Other commercial sigs have been heard here, which have not been identified, but which appear to be inter-Island and vehicle services—some f.m. and some a.m. Freqs. are from 49.6 to 50 Mc. Some have rich American burrs, while others sound like a foreign language. Some are very good. "What about one of the speed boats buddy? That any use? Send 'em over on a tug boat. . . . Station names sounded like Fawn, Francis, Rumbold, one American voice on another net is deliciously feminine. Doesn't take any nonsense from the boys on the other stations. I've over 20 contacts and have missed out on 49.6 beaming from the east at 0230 E.A.S.T. Work that one out VK3. Radio Peking has also been heard, but on 50 Mc. band in VK5. I'm not interested in that case.

"The position at present is that JAs are coming in almost daily in very good openings (in fact I had to break off writing this thing to take part in one, I worked 11 stations in the last 10 minutes of the band was open). Up to 30 odd stations have been worked in one sitting. My present total is over 150 different JA stations. I've over 20 contacts and have missed out on 49.6 beaming from the east at 0230 E.A.S.T. Work that one out VK3. Radio Peking has also been heard, but on 50 Mc. band in VK5. I'm not interested in that case.

## ROSS HULL MEMORIAL V.H.F. CONTEST, 1958-59

Notification has been received from the Federal Contest Committee that the Rules supplied incorrect information to "A.R." for this Contest. Under the heading of Contest Calendar, the Rules were incorrectly stated to be the same as for 1956-57.

The Rules for the Ross Hull Memorial V.H.F. Contest 1958-59 are the same as for the 1957-58 Contest. These were published on page 11 of the August 1957 issue of "A.R."

The 1958-59 Contest commenced on 1st December, 1958, and concludes on 31st January, 1959. A special award will be issued for the greatest distance over 3,000 miles.

think that the trouble is that there are not enough active ZS stations to ensure the constant monitoring of the band that is necessary to take advantage of any opening. Think the above covers the position over here adequately.

—T3, Bob 6BE." The openings remained fairly constant during the first three weeks of Nov. and then fell off. The period culminated in the great opening of the 18th when VK4s had their first experience of JA QRM. That couple to Sporadic E and extended sound wave work at the same time proved an enlightening experience to new operators on the band and was reminiscent of the years around 1954 when activity in all Divisions was at a very high level with Sporadic E openings coming thick and fast. More than a few of the old timers were heard making a re-appearance on the band, pick and shovel apparently having been used to clear off the accumulated dirt on the band.

Vern ALK, as well as working into other Divisions and ZL, made the Brisbane gang happy by contacting them, in the meantime having his first contacts with Townsville 110 miles away. That ZL must have been the first VK-ZL QSO for the season. Strange the way the ZLs have been missing so far. The VK3 gang had an opportunity to work VK1 on the 18th also, they were heard over there.

KR8AP commenced skeds ve beamed at W land, 50.1 Mc., 0900-0930 E.A.S.T., on Nov. 30, with alternate 5-minute periods of transmitting and receiving. He also has a ve beam aimed at VK and if conditions indicate an opening or he hears the other side calling VK, he shall be on the job in this direction. KR8AP on 50.120 Mc. and KR8BS around 50.1 Mc. should have been acted by the middle of Dec. After speaking that direction, both Jock Z3DG and David Z3AQ heard a DU under the QRM during the opening of Nov. 18, the first reported to VK3. Nov. 30 found K1AU working into ZL and JA. VK3ERZ was reported heard at 1210 E.A.S.T. on Nov. 22 by the V4E. The activity is there boys, go and work it!

It is up to you yourself now to judge whether the Ross Hull Contest has now degenerated into a farce. By Dec. 3 some VK3 stations had registered 80 local contacts to score points. Very hard on the country v.h.f. man. Surely the time has arrived to run the Contest in two divisions, one for 50-54 Mc. and 56-60 Mc. DX contacts alone to count, the other for 144 Mc. and higher where any contact would score, local or otherwise. 50F.

## ZLS LOSE 50.51 Mc.

Just as we were going to press a message was received from the ZLS and ZSD stating that "As from 1st January, 1959, the ZLS lose 50-51 Mc. The 51-53 Mc. section will still be available on a shared basis. The Government is starting t.v. experiments on 54-61 Mc. during 1959."

## NEW SOUTH WALES

Hi, chaps, well how did your Xmas go? Or did it still go on? Well, on p.m. 24th, or so, passes another year which we feel has been full as regards organising v.h.f. activity meetings, field days, fox hunts, etc. Of course there may only be some possible future participation and support of Institute affairs, and whilst on this subject it is perhaps opportune to describe briefly some of the details of some details of the V.H.F. and T.V. Group. The Group is a section of the W.I.A. and membership of the W.I.A. allows you full status in the Group. There is no fee for joining, but it is required, if you wish to join the Group, is the completion of a form for our record purposes. If you are not a member, but you desire, your membership in the W.I.A. can be arranged at the meeting. Meetings are held on the first Friday of each month at the T.V. Studio in the Gore Hill Tech. College, right under the t.v. towers. The lectures cover quite a wide field, and should you perhaps be more inclined to walkie-talkie, but cannot attend the Div. meetings, come along as you will probably be surprised at the number of d.c. fans at the meetings.

For the v.h.f. enthusiast there is the night fox hunt held each month on 144 Mc. and generally one field day or fox hunt held on the Sunday of each month. There are also scribbles, tours of inspection, contests, Xmas party, annual auctions, etc., all geared to keep you interested. So accept our invitation and come along.

Meeting.—At the Nov. meeting an interesting time was given to the new equipment. John 2ZJL dealt particularly with v.l.v.m. and provided us with an interesting circuit. Keith Z2JK described a nifty transmitter he had built to walkie-talkie, and Bob Z4G gave some points on overtime one.

Field Day.—The spring field day was well enjoyed by participants. All fixed signals were heard from portable stations. Results will be given next month.

Fox Hunt.—A very enjoyable evening was held on Nov. 18th, and eight cars participated. Phil Z2BB was fox and he was found by Z2BB/ZRX. A somewhat surprise, but very enjoyable. The fox was found by Z2BB's XVI at their QTH following the event.

Geosford.—The Group was well represented at the Central Council Conference and took away prizes and disposal equipment.

50 Mc.—Two major openings occurred during Nov. on 8th and 18th, during which openings were heard from VK3, VK4, VK5, and VK6. Otherwise the band has been fairly quiet, but the activity has urged the building of equipment.

144 Mc.—Nov. has seen the more frequent uses of v.l.o.s. and very stable signals have been heard from Z2FC, Z2BB and ZABZ. The band has been fairly quiet, but the activity has urged the building of equipment.

Future Events.—Jan 21, hidden tx hunt with Z2BB/ZRX as fox. Please note that there will be no January meeting.—2AWZ.

## VICTORIA

6 metre operators in VK3 experienced the best break through in the re-opening of the band on Nov. 18. VK4 signals were first heard at 1210, then later at 1202. VK2 signals, all at times over 59. Quite a few VK3 stations were operating and combined with first reports to VK3. Nov. 30 found K1AU working into ZL and JA. VK3ERZ was reported heard at 1210 E.A.S.T. on Nov. 22 by the V4E. The activity is there boys, go and work it!

The newly instituted v.h.f. scrambles are proving quite popular and over 20 stations were on deck for the Nov. six and two mx scramble. Ron 3AHJ drew for first place on 6. For those who may not know, the 2 mx scramble takes place on 54-56 Mc. and the 6 mx scramble on the fourth Sunday of each month, both between 1945 and 2015 hours.

Mr. Don Rodini, who developed the antenna system for the 56 Mc. link system for New South Wales and Tasmania, was the lecturer for the Nov. v.h.f. meeting. Mr. Rodini described methods for measuring the gain of antennas and pointed out traps for the ordinary home experimenter. He also described experimental curves for 2 and 3 element beams and extended those for long stay antenna. Mr. Rodini pointed out that the antenna only be acquired at the expense of space and expressed the opinion that some of the figures quoted for commercial t.v. antenna may be a little bit optimistic.

Seven stations were out portable for the Nov. field day, but only two were kept busy during quite a few home stations. Results next month. The next field day will be held on Jan. 25 and will coincide with the National Field Day.—SZAL.

288 Mc.—Active at Anakie, some 15 miles from Geelong, Jim 2ABT has had a QSO with 3BAK and has heard SAUX on 288 Mc. Jim has two 7193s mod. osc., super regen 953 rx, Peter SZAV on 288.6 with xtal control, 3 miles from Geelong has been heard by 3ABK and 3BU, but still has to build his rx. Active also in the Geelong area, or just on the verge, are Dick 3ABK, 288.28, xtal control; Fred 3ALG two 7193s mod. osc., with 3BU cutting in; Bill 3BU has received his Customs permit for a vidicon camera tube and ordered it from the Baird Atomic Television Corp. Hoping to receive it shortly. Also interested in building Amateur t.v. gear are 3UT, 2AWW and 4MT. 4JE has a vidicon camera tube but has no idea as to the progress he has made on his gear.—3BU.

#### 50 Mc. P.R.P.

Advice has been received from Mr. Southworth that P.R.P. will concentrate on scatter research during 1959.

The relation between scattering, particularly T.E. and the solar cycle, is little understood at present.

VKs can assist by reporting on any opening in which scattering is suspected to be present.

Observations made by the writer last summer indicated that during all big E openings scattering was occurring. A number of VK2s, 3s and 5s were heard and worked by scatter.

It is necessary to search carefully with the b.f.o. on, looking for weak fluttery signals. C.w. is an advantage but not always a must.

C.w. Segment: In the U.S. call areas the first 100 Kc. is c.w. only by P.C.C. regulation. It has been suggested that in the VK the first 80 Kc. be c.w. only by gentlemen's agreement.—VK3ALZ.

#### SOUTH AUSTRALIA

Several new boys on the band this month. Max 6GF, an old-timer on 50 Mc. 6 to 9 years ago; John 5ZDL, who is v.f.o. controlled and has a 4 el. 50 ft. up; Colin 5ZDB with an 807 in the final running forth, and a 4 el. also; George 6DE, located at Tapleys Hill, with a good take off for v.h.f. contacts. Curly 5ZBL damaged his 4 el. while cleaning it and has only a folded dipole now, what about the DX Curly?

Several chaps on mobile these days. Ken 5BC doing sterling work on W.I.C.E.N. practices with a 50.2 Mc. link based on Mt. Lofy and Mt. Barker. Graham 5ZAP on 50.25 Mc. putting in very strong signals from various sections, and 5ZBZ working back from W. Llanstown through the hills to the city, quite a nice fat signal, I'm told. Heard Eric 5ZAQ with mobile gear the other night but understand that it is not 100 per cent yet. Looks as though we will soon have enough mobiles for a fox and hounds contest.

John 5ZBA has his v.f.o. ticking, sounds good John, and Col 5BQ has been experimenting with another v.f.o. Ken 5BR realizes the potential of a v.f.o. and has a converted ATX v.f.o. coming up. Gilbert 5GX has a new modulator and Ken 5XC and Bill 5XZ are experimenting with wide-band f.m. for link work on 51.6 Mc. and 52.4 Mc. Hughie 5BC at Berri has been breaking in 2 mc. mobiles often on 50 Mc. and we hear quite a few DX stations calling him. Ron 5MK was heard working 5ZAB at Renmark, could not hear that station myself.

6FD was heard mobile in Adelaide, but have not been able to contact him myself. With the Xmas holidays close at hand, we should hear a lot from visiting 6 and 2 mc. mobiles. Still some activity on 288 Mc. and hear most of my news through George 5ZGA when he is cross-band. Brian Tiddeman now has the call of 5TN, hope you still stick to the v.h.f. band Brian.

A openings have not been prolific this last month though the 20th was a red letter day, everybody getting their 6 or so contacts. On 15th the VK4s came through at 1500 hours, then the JA's followed later in the afternoon by the VK2s. The 6th December saw a nice opening to VK7 with 59 plus reports both ways. There has also been some scratchy openings to VK6 and VK4.

An application has been lodged with the P.M.G. Wireless Branch to run a beacon sta-

tion on the 50 Mc. band by the W.I.A. (S.A. Division). Power, approximately 500w., using a vertical radiator in continuous operation. This is a sound proposition and should be supported by all v.h.f. enthusiasts, and should be considered by other Divisions. It will be of great value in obtaining data for the Geophysical Year and will help our case in respect to retaining the 50 Mc. band for Amateur use. Suggested frequencies are from 50.75 Mc. upwards. Cheers.—SZAW.

#### TASMANIA

50 Mc.—TLZ and TBQ have finally worked into JA. Nov. 13 brought contacts with VK2 and VK4, with JA6 heard by TLZ. Nov. 13 VK5s were worked, but on 15th, TLZ worked 8Kc Jas in JA2, 4, 5 and 6, and heard JA1, 3 and 9, also VK2, 3, 4, 5. TBQ was also in on the activity, but no information about his contacts. TXL at Devonport has worked Interstate DX this season also, but unfortunately was having a short spell in hospital when the JAs were coming through.

144 Mc.—TPF now operating at Devonport, had been establishing communication with VK7s in other districts. TLZ and TBQ in Launceston have been contacted by means of reflected signals from hills surrounding Launceston. Both TLZ and TBQ have a steeply rising hill 400 ft. high immediately in the direction of Devonport. 7RL at Stanley has also been contacted, signals over this longer path of 65 miles being better than those to Launceston, 45 miles away. T.v. signals on the coast seem to be always present and it was thought that there must have been a leak activity in VK3, but this was disproved on 26th when TPF worked 3ALZ on c.w. and heard 3ZRO, 3ZDW and 3ZDI. 3ALZ reports having heard TLZ.

288 Mc.—TKC and TMZ at Devonport gave demonstration of mod. osc. gear at the last W.I.A. meeting and have interested members. Max Ives has his A.O.C.P. and has built up some gear for this band while awaiting his call sign. TLZ and TBQ have also established tx and rx in operation.—TPF.

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Had a visitor to the shack 't'other night. Eric ex-VK2VZ, which is now Waga commercial station. He was most interested in the changes in gear since his day of roll your own, with crystals ground from eye-glasses and counterpoised antennae. When last seen a few days later, he was wrecking several broadcast sets to build up a s.w. rx. New call on the band soon?—2ASZ.

## VICTORIA

As previously advised, the last meeting was family night and thanks to President Fred and his willing band of able workers, the evening proved a howling success in more ways than one.

There were pictures for all, Father Xmas for the tinies, presents for children up to twelve years of age and an excellent supper to round off the night. The meeting was particularly well patronised and extra seating had to be found for the overflow. Fred was right in the thick of things and seemed to be thoroughly enjoying himself.

During the evening, Mr. Dobbyn, who for many years kept a friendly eye on the W.I.A. from the P.M.G.'s Department, was presented with an inscribed barometer-thermometer set from the Victorian Division as a mark of appreciation for the many years of pleasant associations with him. It was a little unfortunate that the night was our Christmas "Doy" as I am sure that Mr. Dobbyn could have given us some very interesting reminiscences judging by his few remarks. Perhaps our President could persuade him to give us a longer session at a later date as I am sure it would be appreciated.

In the Sunday morning broadcast, prior to the meeting night, President Fred advised the Division that after a long period of effort on the part of Council and the Building Committee, a property had at last been found to house the Victorian Division of the Institute. He also confirmed this statement at the meeting night but as negotiations were still in progress for the purchase of the property, he could only indicate in a general way that the address was somewhere in East Melbourne. By the time you read these notes, the place will be ours, so you might as well pop along and have a look and perhaps enroll in the working bees which will by then be on the go. The address is 478 Victoria Parade between Simpson and Powell Streets, and on the south side. It is a two-storey residence. At the moment the building is in a residential zone. This means that we will have to be conscious of the fact that we have neighbors and cut out our mid-night pavement ragchews and the like, but

otherwise our usual activities will be unrestricted. We will be able to run our library with Mrs. May as librarian, conduct our various instruction groups and operate 3W1 on the premises, so things will be much on the same basis as they are at the present address. The monthly meetings will continue to be held at the Royal Melbourne Technical College.

The premises are somewhat larger than the present ones and should therefore be quite well suited to our requirements with very little in the way of alteration. The ground floor will probably accommodate the library and the first floor the tx room and study groups.

From an electrical point of view, the area should be vastly superior to the present site and as good as any that could be found so close to the city. It is also very conveniently placed with plenty of parking space and easy access by public transport.

Plans are well in hand for the installation of the two 3kw. BC610 tx's (we now have) and the v.h.f. set-up should follow soon after. Our President will be seeking assistance, no doubt, for all the jobs that will need to be done and things should be on the move by the time these notes are being read.

We have already received our marching orders from the present address in Queen St. (about six months sooner than expected), so it looks as though we made it just in time.

At the time of writing the method of financing the venture, which will cost about £3,500, has not yet been resolved, but it will probably take the form of a debenture issue suitably framed to suit the needs of all members. It may be possible to include full details of this before the magazine goes to press, but failing that, the February issue will carry the details. It might be a good idea also if the story of the many disappointments which led up to the ultimate triumph could be included. I feel that all concerned in tracking down such a suitable spot are to be congratulated on bringing a most difficult assignment to such a successful conclusion.

To return to the meeting, the following new members attended: Messrs. L. J. Laughton, 2APL; J. L. Martin, 2AZK; K. L. Matchett, 2TL; J. A. Gilmour, D. O. Clausen, A. T. Lewellen, W. J. Vette, and D. L. Seedsman.

Last, but not least, I would like to list the names of those who were responsible in any way for our most successful Christmas night: Firstly, the cats were supplied by Mesdames Higginbotham (3RN), Stafford (3KS, YF of 3XE), Dixon (3TE), Robertson (3WJ), Morris (Geoff's mother), Buckley, Stebbings (3ZGD), Ryan (3AZR), Wardlaw (3ADW), King, Dennis (3TF), Henderson (3ARV) and Neal (3ZAN). The call signs in brackets belong to

the OMs except in the case of Mavis (3KS) who is a YL. I hope to get them all. There were three 3MS who were, of the very excellent Christmas recordings which provided the background music prior to the pictures. Our friend Ken Kibbura (3CW) made a cash donation which was used to buy the sweets. He also played the part of that kindly old "Old Man".

Mrs. Moncrieff shopped for the toys and Keith 3YQ donated some pens and pencils used as gifts. Santa was assisted by Mrs. Lancaster who had a jolly time around on all sides. In addition, there was a power of work done in arranging the tables for supper and I saw some of the "old men" around on all sides here. No doubt these were the second ops, those mentioned above.

The President's thanks to one and all of the above are hereby being issued (inadvertently) for the manner in which they answered the call to arms.

As is usual, there will not be a January meeting owing to the school holidays.

News is to hand that Hans 3AHW was married during last October. As most members are aware, Hans at present is working with the I.G.V. Committee in Europe. Congratulations are extended to both Hans and his XYL, Anjoletta Maria. We are wondering if Hans will be making a reference for phone operation over c.w.t.

## SOUTH WESTERN ZONE CONVENTION

The Convention was held on 15th and 16th Nov. at Ballarat. The first to arrive were Brian 3ADV on Friday and Ken 3AWU and XYL who then met at the railway station by members of the committee.

Saturday afternoon other Hams arrived and were directed to their bookings, etc., from a guest set up at the Civic Hall at 8.30 p.m. on Saturday, all assembled at the "Blue Danube" on Lake Wendouree for the Dinner and Meeting of the Hams. His Worship the Mayor of Ballarat, Cr. G. L. Scott, during the Dinner and officially declared the Convention opened.

After the dinner the YLs and XYLs departed for the picture theatre and the OMs settled down to the zone meeting, an auction, films and a display of gear. At 11.15 the ladies returned and supper was partaken of before departing to bed.

During the evening the prizes donated by the Trade were on display: 6V Gelose vibrator power supply (R. H. Cunningham Pty. Ltd.); Syntex crystal microphone and two miniwatt valve amplifiers (R. H. Cunningham Pty. Ltd.); tuning unit (Ham Radio Suppliers); QCE2/5 tx'ing valve (Phillips Industries); 3 steel tapes and 3 transistor manuals (Electronic Industries Imports).

The official proceedings on Sunday started from the 3HW shack on Tom Boy Hill. John impressed the visitors with his commercial-like set up. The two mx hut lapsed because of insufficient starters. The 80 mx hidden tx was not heard of after they left the shack except for occasional gear noises and control car 3AGV trying to get stronger signals went out about half mile with no results, so pulled into some bushes and became the hidden tx. After a period of waiting, Jim 2ABT arrived by the back door to win after missing the turn-off after having lost the back door.

Bill 3AMH, a member touring Canada, was able to contact John 3HW from Winnipeg and a lengthy contact resulted. 3W1 was therefore listened to from the area.

After lunch proceedings were located at the Wendouree Oval. The all-band scramble was a good success and was won by 3ADV. All stations operated together and were allowed to take up a location within five miles of the G.P.O. and operated for half an hour.

The Ballarat and District Amateur Service gave an interesting display of life saving techniques which kept the Hams silent for half an hour. Afternoon tea and distribution of trophies followed. The Zone President, 3AXU, wound up the day's activities.

Prize winners: 80 mx tx hunt, 1st, 3ABT. All-band scramble, 1st, 3ADV. 2nd, 3ADW. 2 mx contest, 1st, 3ZQ. Hams that travelled the furthest, 3ZDB and 3XJ. First to arrive,

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At the moment of writing, Inky SWF is touring the Eastern States and having a good time. He has had later in the day. I have heard of some sort of throat infection Ds (ex-5DK, now TDK) has been heard on phone and c.w. from Tassy. Don't forget to give him a shout. Your husband, Jim, is a chat with the VKS boys. Alan 5DU, Carl 5SH, Frank 5MZ, Jim 5LM, Max 5OS, and that stranger in VKS, who each have a little trouble with in their regular deck. Jim 5FO is busy with e.f.s. work, but as yet has no regular shack. George 5GB is doing a good job of re-broadcasting on 50 and 44. He is out on Sunday night. Gordon 5HM always seems to be on 40 mx at all sorts of times and can always be counted on for yarn. He is out as busy as a bee, but finds time to pop up occasionally at the monthly meetings. Arch 5XK is heard occasionally on 40 mx. Lance 5XZ has a little trouble with the Blacks down there Arch? Lance 5XL is very interested in group activity and tape recording. Lloyd 5XM is a consistent e.f.s. helper and seems to be enjoying himself immensely. Laurie 5XN is now one of the upper-crusters in Amateur Radio; he is playing around with telephony on 50 and 44. He is out on 14 mc. DX; would you make me a t.v. set, please Mr. Werner, Sir? Graeme 5XV at the moment of writing is in the midst of his 501 exam. He has had no time for Amateur activity. The set-up at his QTH is a bit Gilbertian. Being the son of Gordon 5XU, it is the question of the first one up is on the air.

You are probably all aware that I have a grandson, if you don't know, it is only because he is so young. He is a little fellow around the nearest corner. Anyway, he and I get on very well together. Anywhere you see me, you see him, in fact I find it difficult to get on the busy without him taking charge. He is only four years old, and has already put me in bad with my son-in-law and daughter by proudly saying "I'm a little bit of a grandpa". He has had no time for Amateur activity. The set-up at his QTH is a bit Gilbertian. Being the son of Gordon 5XU, it is the question of the first one up is on the air.

I understand that the VKS Division got out of business this year as the Contest Committee. I don't think anybody will dispute me when I say that they have done a wonderful job under extreme difficulty at times. It is very hard to please all the people all of the time, and this is why I am sure they will continue to smoothly speak for itself. Good work boys.

Fred SMA has been limited to using his 22. There is a new starter up the Murray Valley these days, Harold Fleisher (5ZLH) who will certainly be a good one. He is a young OM to the good old game of Amateur Radio.

Ron 30M came along to the meeting this month and I did not put him in the official list of visitors. I was a bit of a chump and thought he was a spy sent over by that Pincoot Joker in Victoria. I had a chat with him and found him an extra good scout, which rubbed out the spy angle.

Colin 5XY is another one who has been a little quiet on account of exams, but as he came to the 501 exam, he was a bit of a chump, he can be excused. Albert 5ZL has been kept busy with his interest in young people's clubs although he has been heard on 50 mx at the 501 exam. He is a good one. He is a good one with VKS quiet often. He and I usually nod to each other in the members' stand at the football and exchange reminiscences.

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isse--remmon--well we chat about old times.

Charlie 5NN is heard occasionally on 40 mx, but I understand that his main interest at the moment is bowls. Les 5LC has been heard loud and long on 21 and 28 Mc. using his cubical array. He is heard on 40 mx at 21 and 40 mx at times. Luke 5LL is to be heard on 40 mx with his well known brand of home spun philosophy. Jack 5LR is getting more than his share of 40 mx on 21 and 40 mx. He finds time to continue with his building of a t.v. set. Pat 5LT is a regular 20 mx DX hound, and I think that his Port Lincoln signal is well known throughout the State.

Bob 5RI is experimenting with transistors and has also been heard on the air with mobile equipment. Reg 5SR has been in the throes of rx trouble; OK now OM? His 122 will give him good service as a mobile station. 5WC, which is the well known Woormera Radio Club from sturt, about 100 miles north, although I have it on good authority that they have been offered a 1-1. (Sorry, had to censor the rest, this scribble will be better at a smoke night--Ed.) Wick 5WN has gone cuckoo on mobile operating. Austin 5WO at the time of writing has pulled his tower down and is out on 40 mx. He is in the throes of putting up a new one.

Gordon 5XU has been purposefully left to last so as I can express my thanks for all the assistance and advice he has given me in these notes, and also for the help he gives me in the preparation of the weekly paragraphs for the paper. The amount of help I have in this jokers put into Amateur Radio in this State has to be seen to be believed, and if there is anything in the saying that one only gets back from sturt about 100 miles north, I put into it, then he must be getting plenty. Long may he thrive.

Well folks, this is it, believe it or not, this is the end (Hooley-Ed.) The men in the white coats are fastening on my special jacket, assisted willingly by the members of the VKS Council.

On behalf of the VKS Council and myself, I take this opportunity of wishing you all a Happy New Year and plenty of what you want from 1959. I am sure you will not stress, and I say it in all seriousness, don't forget Amateur Radio is only a hobby and should be kept on that plane. I am sure the members of the other fellow must not be doing things your way, but he is travelling along the same road, and last but not least, remember the 501 exam is just around the corner. Radio will always only be as strong as its weakest link. 73 to you and 5NR 5PS.

## TASMANIA

### NORTH WESTERN ZONE

Here we are chaps, 1959 with a whole brand new year in front of us. I take this opportunity of wishing you all the very best of everything that you earnestly wish for yourselves; you, your YL, or XYL, and your family. Also I hope everyone will do their best in the field of Radio and that all associate members will strive their utmost to get their "tickets".

There hasn't been a lot of activity within the zone during the month so news may seem a trifle brief. The Hobbies Exhibition in Launceston during the month went off OK and the local boys, assisted with some gear from the Devonport boys, established quite a varied and interesting section. Roy 7TR was set up and opened on the 1st with the sign 7TV. He battled on gamely most nights against some of the worst conditions experienced for some time in the zone. In the latter half of the month he was out on 40 mx and gave a little trouble to add to the fun. Some 288 Mc. gear was on display and I believe my old one unit mobile one night. As experimental t.v. set was running on a couple of channels, also a couple of scopes displaying wave patterns. Quite an array of interesting radio equipment was also on show and I leave it to you to imagine some of the enquiries from the public. Everybody was electronically counted both in and out of the exhibition, some counter causing no end of bother when people stood too long in front of the light beam.

As our December meeting hadn't been held when the last issue was written, it is reported on same next month along with this month's meeting to be held on the 8th instant. Don't forget to come along and make it as great a success as the last one.

Our Secretary has had a spot of annual leave and I believe he got right on the right "frequency" and made quite a number of successful contacts with folk at Great Lake, 500 miles on the East Coast. Can't agree that that is the way to get your transmitter built Max, but the radio club should make you just right for the building project.

From "reading the mail" I understand Dennis 7DR has at last passed all his exams and he declares there'll be no more study. Congratulations to you, Dennis, you can't use the old excuse of "study" for not being heard on the air from 1958. I suppose that boat will make the new one. Happy and Prosperous New Year to all.

## PAPUA NEW GUINEA

There's not much to tell this month. There was a vast improvement in the attendance at the last monthly meeting, twelve members were present. This is a 100 per cent. improvement and we hope that the members will keep up the interest they have shown. Our President, 8FN, has resigned from the position of President and operator of 8W1. These positions have been filled by 8S1 and 8S2. Our 1st Divisional letter went out this month and we are now waiting for some comments from the outside members who cannot attend the meetings. This should be a great boon and help to get more Amateurs back in the Division. Here's hoping, anyway.

I don't think I would like to welcome the following new members into the Division and trust their sojourn with us will be a pleasant one: Rob 8RD, Jerry 8GK, Bill 8WK, Doug 8DB, Roy 8W1, and Gordon 8S1. Mrs. Anna Clark, XYL of the QSL Officer.

It is anticipated that at the next meeting that a lecture will be given and this will be put on tape and recorded to the members in the Sunday morning hook-up. Now that a news letter is published, it is hoped that members will be able to contribute to the news letter. This will not only help other members but will help the Editor to keep it going, so how about it chaps?

There is quite a bit of activity in Moresby at present. They are about to have gone mad on antennae. Doug 8SB has acquired a tower and is busy putting up a tri-band quad before Christmas, but what about 8S1? Well, 8RR is busy with a G4ZU and should have it working within a fortnight; Rob 8RO has dismantled a long wire on a bent rod and is waiting for the new one to be put up. I am waiting to see how 8SB makes out. No sense in two of them wasting time is there?

The winner of the ragchewers cup this month is 8S1. I heard 8S1 on 40 mx on the 1st night at 7.30 p.m.; decided to have a chat with him but I couldn't get a word in edge-wise. At 11 p.m. he was still going strong: the 200 watt station, too, so I have given him hope of ever working the tall gentleman. That sea voyage must have been good for the constitution. Now, you don't want any more now, hi. Haven't heard 8GV lately. Still too busy washing nappies, I think. Hope you can spare ten minutes on a Sunday anyway, George.

New year in the States, too, so I have given the boys, too, and give us some news from that neck of the woods. Eddie 8AT has changed to s.s.b. and should be heard in the near future.

The QSL Bureau requests that members make sure their contacts have their call correct, and if possible get them to write the name of the operator on the card as a means of identification. It is getting to be some trouble for the QSL Bureau with the minimum of delay. Cards arrive with odd call signs on them, so if the operator's name is also on the card this would help the QSL Bureau.

There was no meeting for December, the next being the last Wednesday in January. To finish off I would like to wish you all a Merry Christmas and a very happy and prosperous New Year. So 73 for 1958 and be seeing you all in 1959.

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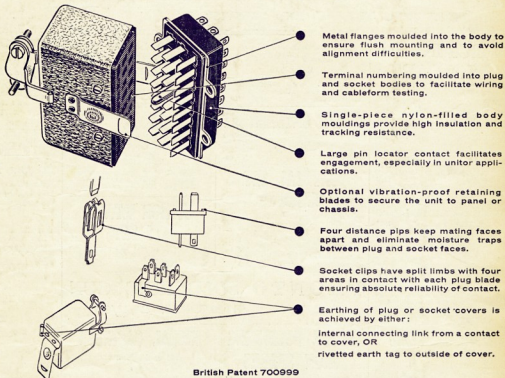
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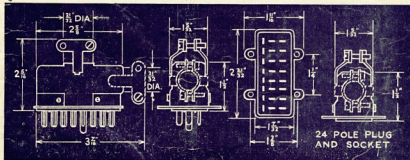
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